

Apparatus for Dispensing Adhesive Tape Strips

The present invention relates to an apparatus for dispensing adhesive tape strips or the like according to the preamble of claim 1.

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A device of such type is known e.g. from US-A-5'207'860. This device comprises a lever with at least two arced toothed racks meshing with various gear wheels. It contains a great number of individual parts. The lever is rotatably supported on an axle and is connected with the racks by means of pins. By means of a relatively complicated gear arrangement and various tension and flat springs a cutting device is operated. Due to the one-sided support arrangement of the racks at the side of the lever a slight momentum is generated acting onto the lever axle in such a manner that jamming of the racks during the downward motion of the lever is not excluded. Furthermore the device described above is relatively voluminous and thus is clumsy in practical operation.

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It is an objective of the present invention to create an apparatus for dispensing adhesive tape consisting of substantially fewer parts and permitting easier handling.

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This objective is met by an apparatus presenting the features of patent claim 1.

The inventive apparatus shows the great advantage that it is very compact, and that it can be operated with particular ease. Furthermore the support of the adhesive tape roll is laid out as an insert member in such a manner that many parts of the adhesive tape dispenser can be re-used.

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Further advantages of the present invention are explained in the dependent patent claims and in the following description, in which the present invention is described in more detail with reference to a design example illustrated in the schematic drawings. It shows:

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Fig. 1 a diagram showing the principle of an adhesive tape dispenser with a lever in its starting position,

5 Fig. 2 the same adhesive tape dispenser according to Fig. 1 with the lever in its depressed state,

Fig. 3 the transporting mechanism of the adhesive tape dispenser,

10 Fig. 4 a top view and a cross-section of the transporting rolls and the folding roll,

Fig. 5 various positions of the lever shown for explaining the drive arrangement of the transporting rolls, and

15 Fig. 6 various positions of the lever in order to explain the cutting process.

For identical elements in the Figures the same reference signs are used, and explanations given a first time also concern all Figures unless otherwise stated.

20 In the Figures 1 and 2 an adhesive tape dispenser 1 is shown comprising a housing 2 with two housing walls 3, 3' arranged essentially parallel to each other, of which merely the outline 4 of the front housing wall 3 is visible. Furthermore a circumferentially extending connecting member 5 is provided between the two housing walls 3, 3'. In the two housing walls 3, 3' a lever 8 is supported on each side on a rotational axle 7, which levers consist of two L-shaped parts 9, 9' (only
25 the front part 9 being visible) and of an upper connecting member 10. On its side facing the housing 2 lever 8 is provided with a cam 11 serving for transporting the strip of adhesive tape. In the two L-shaped parts 9 a respective pin 12 is provided engaging a short sliding guide plate 13 of a triangular rack 14 with a portion
30 toothed over a circular sector. In the lower corner 16 of rack 14 a pin 18 is mounted, which engages a longer sliding guide plate 20 in the housing wall 3. A further toothed rack 14' of the same type, not visible here, is provided on the opposite housing wall 3'. The lever 8 is held in its starting position shown in Fig. 1

by a U-shaped tensioning spring, not shown in detail here. This tensioning spring on one hand side presses one leg against the underside of the L-shaped part 9 and its other leg rests against a protrusion of the housing wall 3. Of course also other types of pressure springs could be applied such as flat springs, spiral springs or similar designs of springs could be provided for this purpose.

Furthermore two transporting rolls 22 and 23 are provided in a support member 24 consisting of two side parts 26, 26' held together by spacer elements 25. The two transporting rolls 22 and 23, knurled in axial direction, each are provided on their side with a gear wheel 27 and 28, which can mesh with the toothed rack 14.

Furthermore a plurality of pins 29 serving as axles are arranged between the two side parts 26, 26', on which an adhesive tape roll 30 is supported rotatably. The pins 29 also serve as spacing parts and as connecting members between the side parts 26, 26'. The support member 24 is laid out as an insert in such a manner that it can be exchanged after the roll of adhesive tape 30 is used up. In the opposite housing wall 3' a slightly curved lever arm 32 with a knife of triangular shape 33, provided as a cutting means, is supported on an axle 34. The lever arm 32 with its lower edge 36 formed as a controlling edge rests against a cam 37 of a gear wheel 38, which also is supported on an axle 39 provided in the housing wall 3'.

On the inner side of the gear wheel 38 a pin 41 is provided, which using a tensioning spring 42 is pre-tensioned against a further pin 43 provided in the housing wall 3'. If gear 38 is disengaged, i.e. not meshing with the rack 14' (Fig. 1), the tensioning spring is compressed. If gear 38 engaging rack 14' has been rotated by the rack over about 180° (Fig. 2), the tensioning spring is in its most pulled-out position i.e. gear 38 would return to its starting position (Fig. 1) if it would not engage the toothed rack 14'.

In Fig. 3 the path of the adhesive tape 45 is indicated (dashed line). The two transporting rolls 22 and 23 in this arrangement are rotated clockwise by the toothed rack 14 via the gear wheels 27 and 28 in such a manner that the adhesive tape 45 is folded longitudinally by the folding roll 47 arranged between the two transporting rolls 22 and 23. The second transporting roll 23 in this arrangement is

provided with two circumferential grooves 48 (Fig. 4) in such a manner that at its centre a circular disk 49 is formed. The first transporting roll is provided with only one circumferential groove 51 which matches with the circular disk 49 which encloses it in a slightly overlapping manner. The folding roll 47 is provided with a ring bulge 52 in its centre zone in such a manner that the adhesive tape 20 is folded in longitudinal direction into a V-shape. In Fig. 3 the support member 24 is well visible, which is laid out as an insert to be taken up in the housing 2.

In Fig. 5 the transporting process is visualised by means of the two transporting rolls 22 and 23. In Fig. 5a the lever 8 is in its starting position, i.e. it is pressed upward by the tensioning spring (arrow A). The toothed rack 14 in this arrangement is not engaging the gears 27 and 28 of the two transporting rolls 22 and 23. The toothed rack 14 here is shown partially with dashed lines as the L-shaped lateral part 9 of the lever 8 is located closer to the housing wall 3 (not shown in this Figure). If lever 8 is now pressed down (Fig. 5b), the toothed rack 14 with the help of the sliding guide plates 13 and 20 is brought into engagement with the two gears 27 and 28 in such a manner that the transporting rolls 22 and 23 are rotated clockwise and that the adhesive tape 45 is transported. When lever 8 is pressed down completely, the toothed rack 14 still engages the gears 27 and 28. Only after lever 8 is released, and moves upward under the action of the tension spring, rack 14 is disengaged from the gears 27 and 28, i.e. the gears 27 and 28 come to a standstill, and the adhesive tape is not transported further. During the downward movement of lever 8 from its uppermost position (Fig. 5a) to its lowermost position (Fig. 5c) a strip of adhesive tape of exactly defined length thus is transported by the transporting rolls 22 and 23. Lever 8 also can be released already at an intermediate position (Fig. 5b) in such a manner that the toothed rack 14 is disengaged from the gears 27 and 28. If lever 8 is pressed down again, a correspondingly longer strip of adhesive tape is generated. By repeated lever operation thus a strip of any length desired can be obtained.

In Fig. 6 the cutting operation is visualised in further detail. The toothed rack 14' is moved downward in similar manner as rack 14 by lever 8. As indicated in Fig. 6

rack 14' is provided with teeth only in its lower zone, which can engage the gear wheel 38. In the lowermost position of the rack 14' (Fig. 6c) its teeth still engage gear 38 in such a manner that the tensioning spring 42 is tensioned fully. If now lever 8 is released, the gear 38 with the cam 37 keeps rotating clockwise, and the lever arm 32 with the knife 33 of triangular shape jumps upward in such a manner that a strip of the adhesive tape 45 is severed (Fig. 6d). As the adhesive tape previously has been folded in V-shape, the strip severed presents a straight line cut. If now lever 8 is released at an intermediate position (Fig. 6b), the lever arm 32 cannot jump back as the gear 38 and thus the cam 37 are rotated back in such a manner that no strip is severed yet. Thus owing to the co-operation of the transporting rolls 22 and 23 and the non-activated knife 33, the length of the strip exceeding a minimum length (one beat) can be determined at will. As explained already with reference to Fig. 5, the toothed rack 14' also can be provided with teeth over its full length. The racks 14 and 14' on the other hand also can be formed as a unit member with the L-shaped parts 9 and 9' in which arrangement then the pin 12 and the shifting guide plate 13 are dispensed with.

The skilled man will appreciate that the mechanism of the adhesive tape dispenser 1 described above comprises very few individual parts, which results in considerable material and cost savings. A further advantage of the inventive adhesive tape dispenser 1 is seen in that the essential elements such as the housing 2 with the lever 8 and the cutting means 33 are re-usable, and that merely the insert or support member 24 with an adhesive tape roll 30 have to be exchanged. This results in a further reduction of environment pollution. Furthermore the inserts or support members 24 can be recycled.

List of Reference Numbers Used in the Figures

	1	adhesive tape dispenser
	2	housing
5	3, 3'	housing wall
	4	contour
	5	connecting member
	7	axle of rotation
	8	lever
10	9, 9'	L-shaped part
	10	upper connecting member
	11	cam
	12	pin
	13	first shifting guide plate
15	14, 14'	toothed rack
	15	circular sector toothed portion
	16	lower corner
	18	pin
	20	longer arched shifting guide plate
20	22	transporting roll
	23	transporting roll
	24	support member
	25	spacing member
	26, 26'	lateral part
25	27	lateral gear wheel
	28	lateral gear wheel
	29	axle
	30	adhesive tape roll
	32	lever arm
30	33	knife of triangular shape
	34	axle
	36	lower edge
	37	cam
	38	gear wheel
35	39	axle
	41	pin
	42	tensioning spring
	43	pin
	45	adhesive tape
40	47	folding roll
	48	circumferential groove
	49	circular disk
	51	circumferential groove
	52	circumferential bulge in the central zone
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